

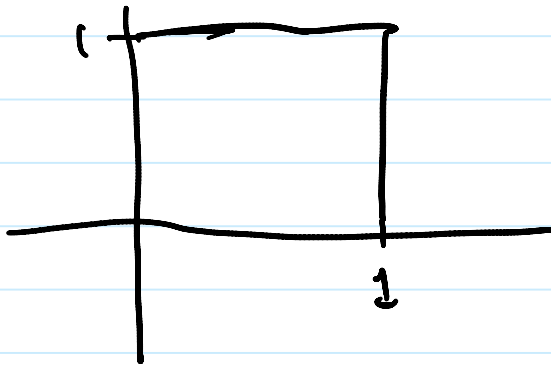
# Prelab 4

Thursday, November 5, 2020

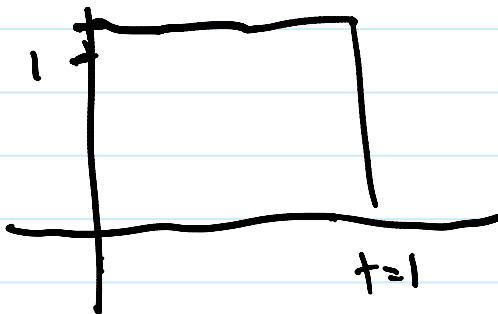
12:10 AM

$$1. \quad S_1(t) = u(t) - u(t-1) \quad S_0(t) = -S_1(t)$$

$S_1(t)$ :



$$y(t) = S_1(t) \cdot S_0(t)$$



$$t < 0, y(t) = 0$$

$$0 < t < 1, y(t) = t$$

$$1 < t < 2, y(t) = 2 - t$$

$$2 < t, y(t) = 0$$

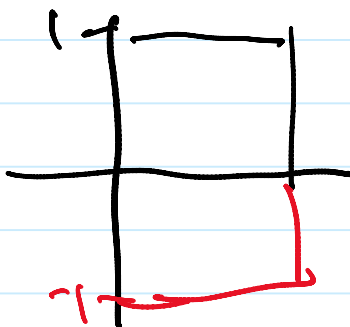
start time = 0

peak:  $t=1$

end:  $t=2$

So plot A

$$y(o)(t) = S_1(t) \cdot S_0(t)$$



Start:  $t=0$   
 peak  $t=2$   
 end:  $t=3$  } plot B

2. If  $y_1\text{-corr} > y_0\text{-corr}$ :

$S = 1$

else:

$S = 0$

3. def decode( $r, f_s, s_0, s_1$ ):

$t_s = 1 / f_s$

$y_0 = \text{np.convolve}(r, s_0) \cdot t_s$

$y_1 = \text{np.convolve}(r, s_1) \cdot t_s$

midpoint = int(len( $r$ )/2)

$y_0\text{-corr} = y_0[\text{midpoint}]$

$y_1\text{-corr} = y_1[\text{midpoint}]$

if  $y_1\text{-corr} > y_0\text{-corr}$ :

return 1

else:

return 0